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ABSTRACT

This digest presents basic information for those providing educational services to children with dyslexia who have phonological core deficits. First it provides a brief overview, noting the incidence of dyslexia and the large number of these children with phonological deficits which result in far less academic progress than experienced by other children with learning disabilities. A definition of phonological core deficits notes the major components of phonemic awareness, sound-symbol relations, and storage and retrieval of phonological information in memory. Several criteria for classification and identification of dyslexia and learning disability are summarized and popular assessment measures are listed. Ten suggested interventions are noted, such as teaching metacognitive strategies, providing direct instruction in language analysis and the alphabetic code, and using techniques that make phonemes more concrete. Also listed are some print resources for teachers, relevant associations, and electronic resources. (DB)

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Julie A. Frost and Michael J. Emery

Overview

Approximately 3% to 6% of all school-aged children are believed to have developmental reading disabilities, or dyslexia. In fact, almost 50% of children receiving special education have learning disabilities, and dyslexia is the most prevalent form. Consequently, dyslexia has been given considerable attention by researchers and extensive literature exists on instruction and remediation methods.

Dyslexia is a neurocognitive deficit that is specifically related to the reading and spelling processes. Typically, children classified as dyslexic are reported to be bright and capable in other intellectual domains. Current research indicates that the vast majority of children with dyslexia have phonological core deficits. The severity of the phonological deficits varies across individuals, and children with these deficits have been shown to make significantly less progress in basic word reading skills compared to children with equivalent IQs. For example, some experts report that between ages 9 and 19, children with dyslexia who have phonological deficits improve slightly more than one grade level in reading, while other children with learning disabilities (LD) in the same classroom improve about six grade levels. Without direct instruction in phonemic awareness and sound-symbol correspondences, these children generally fail to attain adequate reading levels.

Definition

Phonological core deficits entail difficulty making use of phonological information when processing written and oral language. The major components of phonological deficits involve phonemic awareness, sound-symbol relations, and storage and retrieval of phonological information in memory. Problems with phonemic awareness are most prevalent and can coexist with difficulties in storage and retrieval among children with dyslexia who have phonological deficits.

Phonemic awareness refers to one's understanding of and access to the sound structure of language. For example, children with dyslexia have difficulty segmenting words into individual syllables or phonemes and have trouble blending speech sounds into words.

Storage of phonological information during reading involves creating a sound-based representation of written words in working memory. Deficits in the storage of phonological information result in faulty representations in memory that lead to inaccurate applications of sound rules during reading tasks.

Retrieval of phonological information from long-term memory refers to how the child remembers pronunciations of letters, word segments, or entire words. Children with dyslexia may have difficulty in this area, which leads to slow and inaccurate recall of phonological codes from memory.

Classification and Identification

Historically, classification criteria for developmental dyslexia have been vague and, consequently, open to interpretation. For example, according to the *Diagnostic and Statistical Manual of Mental Disorders*, revised 3rd edition (DSM-III-R), developmental reading disorder (dyslexia) may be diagnosed if reading achievement is "markedly below" expected level; interferes with academic achievement or daily living skills; and is not due to a defect in vision, hearing, or a neurological disorder. Because of such imprecise guidelines, educators and clinicians use a wide variety of criteria when defining dyslexia.

School psychologists classify children based on federal and state learning disability placement criteria. The federal guidelines for LD placement are as follows:

1. Disorder in one or more of the basic psychological processes (memory, auditory perception, visual perception, oral language, and thinking).
2. Difficulty in learning (speaking, listening, writing, reading, and mathematics).
3. Problem is not primarily due to other causes (visual or hearing impairment, motor disabilities, mental retardation, emotional disturbance, or economic environment or cultural disadvantage).
4. Severe discrepancy between apparent potential and actual achievement.

While the federal guidelines are more specific than the DSM-III-R criteria, they are still rather nonspecific. Consequently, eligibility criteria for LD services for reading disabilities vary from state to state.

Fortunately, there is some general agreement among educators, clinicians, and researchers in terms of identifying phonological deficits in children with dyslexia. Phonological processing impairment is generally identified by significantly impaired performance (generally, a standard score less than 85) on phonological processing tasks. The following include some assessment measures that may be used to identify these phonological core deficits:

Features	*Assessment Techniques*
General reading ability	Metropolitan Achievement Tests - Reading Gray Oral Reading Tests, 3rd Ed. WRAT-R-Reading WRMT-Word Identification
Storage and Retrieval	SB-4-Memory for Sentences Verbal Selective Reminding Test Rapid Automatized Naming Test Boston Naming Test
Phonological awareness	WRMT-Word Attack Test of Awareness of Language Segments (TALS) Test of Auditory Analysis Skills (TAAS) Lindamood Auditory Conceptualization Test Decoding Skills Test

Suggested Interventions

- Teach metacognitive strategies. Teach children similarities and differences between speech sounds and visual patterns across words.
- Provide direct instruction in language analysis and the alphabetic code. Give explicit instruction in segmenting and blending speech sounds. Teach children to process progressively larger chunks of words.
- Use techniques that make phonemes more concrete. For example, phonemes and syllables can be represented with blocks where children can be taught how to add, omit, substitute, and rearrange phonemes in words.
- Make the usefulness of metacognitive skills explicit in reading. Have children practice them. Try modeling skills in various reading contexts. Review previous reading lessons and relate to current lessons.
- Discuss the specific purposes and goals of each reading lesson. Teach children how metacognitive skills should be applied.
- Provide regular practice with reading materials that are contextually meaningful. Include many words that children can decode. Using books that contain many words children cannot decode may lead to frustration and guessing, which is counterproductive.
- Teach for automaticity. As basic decoding skills are mastered, regularly expose children to decodable words so that these words become automatically accessible. As a core sight vocabulary is acquired, expose children to more irregular words to increase reading accuracy. Reading-while-listening and repeated reading are useful techniques for developing fluency.
- Teach for comprehension. Try introducing conceptually important vocabulary prior to initial reading and have children retell the story and answer questions regarding implicit and explicit content. Teach children the main components of most stories (i.e., character, setting, etc.) and how to identify and use these components to help them remember the story.
- Teach reading and spelling in conjunction. Teach children the relationship between spelling and reading and how to correctly spell the words they read.
- Provide positive explicit and corrective feedback. Reinforce attempts as well as successes. Direct instruction and teacher-child interactions should be emphasized.

Resources for Teachers

Adams, M. J. (1990). *Beginning reading instruction in the United States.* ERIC Digest. Reston, VA: ERIC Clearinghouse on Disabilities and Gifted Education. ED321250

Bradey, S., & Shankweller, D. (Eds.) (1991). *Phonological processes in literacy.* Mahwah, NJ: Lawrence Erlbaum Associates.

Lyon, G. R., Gray, D. B., Kavanagh, J. F., & Krasnegor, N. A. (Eds.) (1995). *Better understanding learning disabilities: New views from research and their implications for education and public policies.* Baltimore: Paul H. Brookes Publishing Company.

Stahl, S. A. (1990). *Beginning to read: Thinking and learning about print: A summary.* Cambridge, MA: University of Illinois Center for the Study of Reading. ED315740

Wong, B. Y. L. (1991). *Learning about learning disabilities.* San Diego: Academic Press.

Associations

Division for Learning Disabilities (DLD)
The Council for Exceptional Children
1920 Association Drive
Reston, VA 22091
703/620-3660

Learning Disabilities Association (LDA)
4156 Library Road
Pittsburgh, PA 15234
412/341-1515

National Adult Literacy & Learning Disabilities (ALLD) Center
Academy for Educational Development
1875 Connecticut Avenue, NW
Washington, DC 20009
202/884-8185

National Center for Learning Disabilities (NCLD)
99 Park Avenue, 6th Floor
New York, NY 10016
212/687-7211

Orton Dyslexia Society
724 York Road
Baltimore, MD 21204
800/222-3123

Electronic Resources

Digests published by the ERIC Clearinghouse on Disabilities and Gifted Education are available for downloading or online reading on the AskERIC Virtual Library <ericir.syr.edu>.

The following Internet sites provide additional information on students with disabilities:

Gopher sites: gopher sjuvm.stjohns.edu
St. John's University
Electronic Rehabilitation Resource Center

gopher hawking.u.washington.edu
University of Washington

Listservs:

LD-List — Learning disability information exchange
Address: majordomo@curry.edu
Post to: ld-list@curry.edu

SPEDTALK — Current issues in special education; professionally oriented
Address: majordomo@virginia.edu
Message: subscribe spedtalk *your-full-email-address*
Post to: spedtalk@virginia.edu

SPCEDS-L — Special education students list
Address: listserv@ubvm.bitnet
Post to: spceds-l@ubvm.bitnet

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